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10/555,657	11/04/2005	Tsumoru Ohata	043888-0412	9671
53(80)	7590	09/09/2011	EXAMINER	
MCDERMOTT WILL & EMERY LLP			LEE, CYNTHIA K	
600 13TH STREET, NW			ART UNIT	PAPER NUMBER
WASHINGTON, DC 20005-3096			1726	
NOTIFICATION DATE		DELIVERY MODE		
09/09/2011		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/555,657	<b>Applicant(s)</b> OHATA ET AL.
	<b>Examiner</b> CYNTHIA LEE	<b>Art Unit</b> 1726

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 30 June 2011.
- 2a) This action is FINAL.      2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1,4,6,8,9,16,17,19,22 and 25-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_ is/are allowed.
- 6) Claim(s) 1,4,6,8,9,16,17,19,22 and 25-27 is/are rejected.
- 7) Claim(s) \_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) Information Disclosure Statement(s) (PTO/SB/08)  
 Paper No(s)/Mail Date \_\_\_\_
- 4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date \_\_\_\_
- 5) Notice of Informal Patent Application
- 6) Other: \_\_\_\_\_

***Response to Amendment***

This Office Action is responsive to the amendment filed 6/30/2011. Claims 11, 4, 6, 8, 9, 16, 17, 19, 22, 25-27 are pending.

Applicant's arguments have been fully considered. Claims 1, 4, 6, 8, 9, 16, 17, 19, 22, 25-27 are finally rejected for the reasons stated herein below.

***Information Disclosure Statement***

The Information Disclosure Statement (IDS) filed 9/30/2010, 5/9/2011 has been placed in the application file and the information referred to therein has been considered.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 4, 6, 8, 9, 16, 17, 19, 22, 25-27 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for polyacrylonitrile, does not reasonably provide enablement for a polyacrylic acid derivative. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

The claimed invention encompasses compounds that are outside the scope of the one working example and disclosure. Not only are the claims broad, it appears that the amount of direction, the number of working examples, and the breadth of claims are not commensurate in scope with the disclosure as originally filed. Hence undue experimentation would be required to determine what other compounds other than those disclosed by applicant can be used to make and practice applicant's invention as claimed.

With respect to enablement commensurate in scope with the claims, section 2164.08 of the MPEP states:

"The Federal Circuit has repeatedly held that 'the specification must teach those skilled in the art how to make and use the full scope of the claimed invention without undue experimentation'. *In re Wright*, 999 F.2d 1557, 1561, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993)... The determination of the propriety of a rejection based upon the scope of a claim relative to the scope of the enablement involves two stages of inquiry. The first is to determine how broad the claim is with respect to the disclosure. The entire claim must be considered. The second inquiry is to determine if one skilled in the art is enabled to make and use the entire scope of the claimed invention without undue experimentation."

Factors to be considered when determining whether the claimed invention would require undue experimentation are given in MPEP 2164.01 (a). *In re Wands*, 858 F. 2d 731, 737; 8 USPQ 2d 1400, 1404 (Fed. Cir. 1988). Only the relevant factors will be addressed for determining undue experimentation of the presently claimed invention.

The relevant factors are (A) the breadth of the claims; (B) the amount of direction provided by the inventor; (C) the existence of working examples, (D) the level of predictability in the art; and (E) the quantity of experimentation needed to make or used the invention based on the content of the disclosure.

**Factor (A) Breadth of the claims:**

No guidance is given in the specification for the innumerable possible embodiments encompassed by "a derivative" of polyacrylic acid.

**Factor (B) The amount of direction provided by the inventor.**

Applicant is silent as to what compounds entail a "polyacrylic acid derivative." No guidance is given, except for a disclosure of polyacrylonitrile.

**Factor (C) The existence of working examples:**

There is only one example of a "polyacrylic acid derivative," polyacrylonitrile.

**Factor (D) The level of predictability in the art:**

There is unpredictability in the art because one would not know what types of compound derive from polyacrylic acid in view of the myriad of existing compounds.

With respect to the relationship of predictability of the art and the enablement requirement, MPEP 2164.03 states:

"The amount of guidance or direction needed to enable the invention is inversely related to the amount of knowledge in the state of the art as well as the predictability in the art. In re Fisher, 427 F.2d 833, 839, 166 USPQ 18, 24 (CCPA 1970). The "amount of guidance or direction" refers to that information in the application, as originally filed, that teaches exactly how to make or use the invention. The more that is known in the prior art about the nature of the invention, how to make, and how to use the invention, and the more predictable the art is, the less information needs to be explicitly stated in the specification. In contrast, if little is known in the prior art about the nature of the invention and the art is unpredictable, the specification would need more detail as to how to make and use the invention in order to be enabling. >See, e.g., Chiron Corp. v. Genentech Inc., 363 F.3d 1247, 1254, 70 USPQ2d 1321, 1326 (Fed. Cir. 2004)...The "predictability or lack thereof" in the art refers to the ability of one skilled in the art to extrapolate the disclosed or known results to the claimed invention. If one skilled in the art can readily anticipate the effect of a change within the subject matter to which the claimed invention pertains, then there is predictability in the art. On the other hand, if one skilled in the art cannot readily anticipate the effect of a change within the subject matter to which that claimed invention pertains, then there is lack of predictability in the art. Accordingly, what is known in the art provides evidence as to the question of predictability...However, in applications directed to inventions in arts where the results are unpredictable, the disclosure of a single species usually does not provide an adequate basis to support generic claims.

In re Soil, 97 F.2d 623, 624, 38 USPQ 189, 191 (CCPA 1938). In cases involving unpredictable factors, such as most chemical reactions and physiological activity, more may be required. In re Fisher, 427 F.2d 833, 839, 166 USPQ 18, 24 (CCPA 1970)[emphasis added]."

**Factor (E) the quantity of experimentation needed to make or used the invention based on the content of the disclosure.**

This factor has been addressed by factors (A)-(C) above.

Thus, the claims are properly rejected for scope of enablement since the two stages of inquiry as set forth in MPEP section 2164.08 have been fully addressed herein by the Examiner.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 10, 11, 13, 16, 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The limitation "a polyacrylic acid derivative" is indefinite because there are a myriad of compounds that may derive from polyacrylic acid.

Further, it is unclear as to what the final product of "a polyacrylic acid" is.

***Claims Analysis***

To avoid 35 USC 112, 2<sup>nd</sup> paragraph issues, the limitation "indefinite-shape particle" has been defined as "shapes having knots, bumps, or bulges based on the primary particles, that is, for example, shapes like dendrite, grape clusters, or coral,

unlike shapes that are spherical or egg-shaped, or that are similar to such shapes" as supported by the Specification pg 5 paragraph [0009].

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4, 8, 16, 17, 22, 25-27 are rejected under 35 U.S.C. 103(a) as obvious over Delnick (US 5948464) in view of Gozdz (US 5571634), as evidenced by Hubbard, Encyclopedia of Surface and Colloid Science, vol.4: Por-Z, 2002, 4397-4398, in view of Xue (US 5928812).

Delnick discloses a secondary battery comprising: a positive electrode; a negative electrode; a porous electron-insulating layer adhered to a surface of at least one selected from the group consisting of said positive electrode and said negative electrode (9:25-40); and an electrolyte (5:5), wherein said porous electron-insulating layer comprises a particulate filler (6:45-52) and a resin binder (7:5-15).

Regarding the indefinite-particle shape, Delnick discloses of fillers using fumed silica. It is noted that fumed silica are amorphous particles, and not crystalline. See Hubbard, pg 4397, 1<sup>st</sup> full paragraph. Gozdz teaches a separator using inorganic fillers such as fumed silica or fumed alumina (3:55-4:9). It would have been obvious to one of

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ordinary skill in the art at the time the invention was made to use either fumed silica or fumed alumina, as taught by Gozdz, since it has been held by the court that the selection of a known material based on its suitability for its intended use is *prima facie* obvious. Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07.

Regarding the limitation in claims 1 and 16 "said particulate filler substantially comprises an indefinite-shape particle, comprising a plurality of single crystalline particles, which has the shape of dendrites, grape clusters, or coral, said shape having a neck, wherein said neck is formed between and joins at least a pair of said single crystalline particles, said neck comprising the same material as said single crystalline particles," the nature of fumed alumina particles meet the limitation.

Hubbard evidences that fumed alumina has a similar voluminous structure to fumed silica (pg 4398, 1<sup>st</sup> full paragraph). Fumed silica has a voluminous structure of roughly globular, extremely small particles partly fused into relatively short, highly branched frameworks that are known as aggregates (Applicant's indefinite-shaped particles) (fig. 1 of Hubbard). The globular particles are the smallest discernible elements of fumed silica and are called primary particles. Their diameter can range from 3 to 50 um depending on the grades of silica. The aggregates, in turn, are clustered in large, three-dimensional, extremely weak networks termed agglomerates. In contrast to aggregates, where particles are strongly held together by necks formed by partial fusion, agglomerates are formed because of weak van der Waals forces. Therefore, aggregates are stable associations that are difficult to disintegrate into

primary particles, whereas agglomerates are fragile and can be readily decomposed into their aggregate components by intense agitation (pg 4397, 1<sup>st</sup> full paragraph).

Regarding claim 1, 16, said indefinite-shape particle comprises a metal oxide (Gozdz'a fumed alumina, 4:9).

Regarding claim 16, the aggregation of single crystalline particles of fused alumina reads on Applicant's "polycrystalline particles."

Regarding claim 4, 17, said indefinite-shape particle comprises a plurality of primary particles bonded to each other, and said indefinite-shape particle has a mean particle size that is twice or more than the mean particle size of said primary particles and not more than 10 um. Hubbard evidences that the aggregates contain several to tens of primary particles that are between 0.01 to 0.3 um in size (pg 4397, 1<sup>st</sup> full par.).

Regarding claims 22, 25, said indefinite-shape particles are adhered with said binder.

Regarding claims 26, 27, Gozdz discloses said metal oxide comprises alumina particles (4:9).

Regarding the limitation in claim 1, "said indefinite-shape particles maintain their shape when subjected to a shearing force to disperse the particles in a liquid component to form a slurry", the "aggregations" of fumed alumina meet the limitation.

Regarding claims 1 and 16, Delnick does not expressly disclose the porosity of the separator. Delnick discloses that the separator is a liquid-electrolyte-permeable separator, which comprises a matrix of solid particulate material which permits liquid electrolyte to permeate the layer of solid particulate material (5:25-27). Delnick further

discloses that the binder in the separator ink works like an adhesive that adheres individual filler particles to each other, leaving the interstices between the particles open (8:25-27). It would have been obvious to one of ordinary skill in the art at the time the invention was made to vary the amount of open interstices in the separator for the benefit of allowing the electrolyte to permeate the separator.

Regarding claim 1, Delnik modified by Gozdz does not disclose that the resin binder comprises a polyacrylic acid derivative. Delnik discloses that the resin comprises PVC, PVdF, and EPDM resin (7:5-15). Xue teaches polymers used in any or all of the anode, cathode and separators as binders, include Polyethylene oxide (PEO), Polyurethane, Polyacrylonitrile (PAN), Polymethylmethacrylate (PMMA), etc (7:24). It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute polyacrylonitrile of Xue for Delnik's resin because it has been held by the court that the selection of a known material based on its suitability for its intended use is *prima facie* obvious. Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07.

Regarding claim 8, Delnick discloses a lithium ion cell (9:33), but does not disclose claim 8. Gozdz discloses said positive electrode comprises a composite lithium oxide (1:51), said negative electrode comprises a material capable of charging and discharging lithium (1:58), and said electrolyte comprises a non-aqueous solvent and a lithium salt dissolved in the non-aqueous solvent (2:63-65). It would have been obvious to one of ordinary skill of art at the time the invention was made to use the

components of Gozdz in the lithium ion battery of Delnick for the benefit of forming a lithium ion battery.

Claims 6, 19 are rejected under 35 U.S.C. 103(a) as obvious over Delnick (US 5948464) in view of Gozdz (US 5571634), in view of Xue (US 5928812), as evidenced by Hubbard, Encyclopedia of Surface and Colloid Science, vol.4: Por-Z, 2002, 4397-4398 as applied to claim 1, and the datasheet of Kynar Flex 2801, retrieved from <<http://www.arkema-inc.com/literature/pdf/780.pdf>>, on 9/2/2011.

Regarding claims 6, 19, the binder of Delnick PVDF Kynar Flex 2801 (10:3) is in the form of powder. See page of the attachment.

It would have been obvious to one of ordinary skill of art at the time the invention was made to form the polyacrylonitrile of Xue in the form of powder, as taught by Delnick, for the benefit of easy mixing the binder and the filler.

Claim 9 is rejected under 35 U.S.C. 103(a) as obvious over Delnick (US 5948464) in view of Gozdz (US 5571634), in view of Xue (US 5928812), as evidenced by Hubbard, Encyclopedia of Surface and Colloid Science, vol.4: Por-Z, 2002, 4397-4398 as applied to claim 1, further in view of Yu (US 6080507).

Delnick modified by Gozdz, Xue all the elements of claim 1 and are incorporated herein. Delnick discloses a porous insulating member, but does not disclose further

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comprising a separator sheet that is interposed between said positive electrode and said negative electrode, said separator sheet being independent of both said positive electrode and said negative electrode. Yu teaches a trilayer separator. The trilayer comprises a shutdown layer made of a filler and a polymer (4:10-15) wherein each side is sandwiched by a microporous layer. See Abstract. The trilayer exhibits reduced splittiness and good puncture strength (3:20-22). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add additional layers to the insulating layer of Delnick, as taught by Yu, for the benefit of providing added strength and protection against puncture.

***Response to Arguments***

Applicant's arguments filed 6/30/2011 have been considered. The following arguments are addressed:

In regards to the limitation "a polyacrylic acid derivative", it is indefinite because there are a myriad of compounds that may derive from polyacrylic acid. Further, it is unclear as to what the final product of "a polyacrylic acid" is. Hence, the 35 USC 112, 2<sup>nd</sup> rejection has been applied.

The prior art arguments are moot in light of the new grounds of rejections.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CYNTHIA LEE whose telephone number is (571)272-8699. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Cynthia Lee/  
Primary Examiner, Art Unit 1726